REMARKS/ARGUMENTS

Statement of the Substance of the Interview

The undersigned attorney thanks the examiner for extending the courtesy of allowing a telephonic interview on March 15, 2010. The purpose of the interview was to discuss the § 112 rejection. During the interview, the undersigned pointed to paragraphs [0065] and [0073] of the pre-grant publication as providing support for the amended claims. It was also argued that paragraphs [0071] and [0072] provide support for the counter operation and that the most reasonable interpretation of the phrase "of the present invention" in the first sentence of paragraph [0074] is an invention in which all the PEs are responding to the same command (per paragraph [0073]) and that the commands are performed a number of times equal to the number of PEs in the row or column (per paragraph [0065]). The examiner responded that "maybe" there was support for the amended claims but wanted to see the argument in writing and needed additional time to consider applicant's argument. The examiner indicated that if the § 112 objection was overcome, the amended claims were distinguishable over Crozier (U.S. 5,081,700).

35 U.S.C. § 112 First and Second Paragraph Rejections

In paragraphs 5 and 9 of the Office action, claims 1-15, 22-29, and 36 stand rejected under 35 U.S.C. § 112, first and second paragraphs, respectively, for substantially the same reasons. Independent claims 1 and 36 recite "each shifting operation being preformed such that each processing element in each row or column receives the data originally held by every other processing element in that row or column, respectively." Independent claims 8 and 22 contain similar language. It is the Office's position that the specification fails to support the limitation that *all* shifts are done in such a way. Applicant respectfully disagrees.

Beginning with paragraphs [0049] and [0050], a description of the hardware of FIG. 5 is provided. Paragraph [0051] provides:

> [0051] With the hardware previously described, a number of shifting operations may be performed as illustrated in FIGS. 6A, 6B through 10A, 10B. In FIG. 6A and 6B, an edge shift is illustrated. In the edge shift, the edge/col registers 56 are active as

> the data is shifted left to right (west to east) as shown in FIGS. 6A, 6B. The reader will recognize that an edge shift may be performed in the other direction, right to left (east to west). Alternatively, edge shifts may be performed by using the edge/row registers 54 in a north to south or south to north direction.

Paragraph [0052] describes a type of planar shift, paragraph [0053] describes a type of wrap shift and paragraph [0054] describes a type of vector shift.

Paragraph [0055] returns to a description of FIG. 5 and the hardware connections needed for a broadcatch or broadcast operation.

Paragraphs [0059] through [0063] describe the movement of data according to broadcast or broadcatch instructions.

The aforementioned paragraphs demonstrate, at a minimum, that the inventor was in possession of the concept of shifting data around the arrays seen, for example, in FIG. 6A, 6B through 14A and 14B. That fact is confirmed by paragraph [0064] which provides:

> [0064] Using the aforementioned instructions or operations, a group of instructions may be combined into an instruction set for manipulating data within the array 36 of PEs. The instruction set may include a single instruction or operation or a combination of instructions. Each individual instruction is carried out though [*sic* through] a series of shifts.

The next paragraph provides:

> [0065] In operation, an input matrix of data is placed on the shift network, and moved around by using a combination of north, south, east and west shifts. In addition, the column select register 59 and row select register 61 may be used to determine which of the PEs is active. The exact combination of active PEs, instructions, and direction in which the instruction (shift) is performed will depend upon the particular array manipulation required. As the instructions are executed and the shifting proceeds, each PE will be presented with different array values. <u>For example, if a wrap shift is performed a number of times equal to the number of PEs in a row, each PE in the row will see every value held by all of the other PEs in the row</u>. (Emphasis added).

Paragraph [0065] demonstrates, at a minimum, that the inventor was in possession of the concept of shifting the data a number of times equal to the number of PEs in a row or column so that each PE will see every data value held by all the other PEs in the row or column.

The next two paragraphs provide as follows:

> [0066] A PE can conditionally select any of the values it sees as its final output value by conditionally loading that value, which is representative of an output result matrix. However, only one value, the desired result, is loaded.
>
> [0067] All X values are passed through the PE; the required output value is conditionally loaded once it has arrived in the PE. The conditional loading can be done in various ways. e.g. by using any PE registers except X, R1, or R2.

Those paragraphs demonstrate, at a minimum, that the inventor was in possession of the concept of each PE selecting as its output any of the data values that it sees, and if the data is shifted a number of times equal to the number of PEs in a row or a column per paragraph [0065], then each PE sees all the data values in its row or column.

Following paragraph [0067] is an example showing three clock cycles while paragraphs [0071] and [0072] describe the operation of the counters used to determine which of the values received as a result of the shifting is selected as the output.

The "method of the present invention" is then summarized in paragraph [0073] as follows:

> [0073] By using the method of the present invention, PEs within a group of PEs can be individually controlled as to the output value which the PE selects for output into the final matrix. Thus, although all of the PEs are responding to the same command, e.g., an east to west wrap shift, each of the PEs is capable of selecting different data at different points during the execution of the instruction thereby enabling various types of data manipulations, e.g., transpose, reflection. Furthermore, by determining which PEs are active, additional flexibility is provided so that subsets of data can be manipulated. (Emphasis added)

This paragraph, at a minimum, demonstrates that the inventor was in possession of the concept of having all the PEs responding to the same command and contemplates that the

command is performed a plurality of times to enable each PE to select "different data at different points during the execution of the instruction thereby enabling various types of data manipulations."

To summarize, the foregoing paragraphs demonstrate that the inventor had possession of each of the following concepts:

controlling the movement of data around an array through a variety of different global commands;

combining global commands to achieve data manipulations such as a transpose or reflection;

executing global commands a number of times equal to the number of PEs in a row or in a column; and

controlling the output of each PE through a local count maintained in each PE.

Even without an example of the execution of a three-shears operation, the above set of concepts is sufficient to enable applicant to claim a plurality of shifting operations that result in a three-shears operation being performed.

The Office points to FIGs. 15A-D and paragraphs [0074]-[0076] of the pre-grant publication as an example to support its position that not all shifts are done in this manner. Applicant respectfully reminds the Office that the focus of the inquiry should remain on whether the specification demonstrates that the applicant had possession of the subject matter being claimed, and not whether there is support in the application for some other interpretation of the language.

Applicant further notes that paragraph [0074] begins with this sentence:

> [0074] Turning now to FIGS. 15A through 15D, one embodiment of the present invention for implementing a three-shears method of rotating a matrix is illustrated. (emphasis added)

The "present invention" referred to in the opening sentence is the invention described in the previous paragraphs. It is an invention in which all of the PEs respond to the same command, and because the PEs in the bottom row have to perform a shift a number of times equal to the number of PEs in that row, all the PEs perform a shift a number of times equal to the number of PEs in the rows. It is an invention in which the counters are used as described in paragraph

[0066] to select among the received data values and not to limit the number of shifts that are performed in a row or column. The most logical meaning of "A right wrap shift is performed on the data illustrated in FIG. 15A in a manner such that the top row of data r0 remains fixed . . ." (emphasis added) is that all of the data is moving in response to the shift according to the present invention, and that after each PE selects its output from among the received data, the data in the top row is the same both before and after the shifting has taken place.

For the foregoing reasons, it is respectfully submitted that the rejection of claims 1-15, 22-29, and 36 under 35 U.S.C. § 112, first paragraph, should be withdrawn.

35 U.S.C. § 103 Rejections

In paragraph 12 of the Office action, claims 1-6, 8-13, 15, 22-27, 29, and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,081,700 to Crozier ("Crozier") in view of U.S. Patent No. 6,338,129 to Pechanek et al. ("Pechanek").

As the Office is aware, independent claims 1 and 36 recite "each shifting operation being performed such that each processing element in each row or column receives the data originally held by every other processing element in that row or column, respectively." Independent claims 8 and 22 contain similar language. Assuming that the 35 U.S.C. § 112 rejection has been overcome, that language should be given its ordinary meaning. Because the Office is aware that in Crozier only a single row/column receives all the data originally held in that single row or column, Crozier cannot disclose that limitation. For that reason, the 35 U.S.C. § 103(a) rejection should be reversed.

In the explanation of the rejection bridging pages 7 and 8, it is the Office's position that Crozier discloses selecting data to be stored prior to the next shifting operation in a different direction. Applicant disagrees with this characterization. There is no selecting of data in Crozier. All of the data that goes into the barrel shifter of Crozier comes out of the barrel shifter of Crozier. Compare, for example, FIGs. 4A and 4B. The barrel shifter of Crozier merely delays the output of the data in each column with respect to the other columns to achieve the shift seen between FIGs. 4A and 4B. Thus, all of the data that goes into the barrel shifter comes out of the barrel shifter. There is no selection of data within the barrel shifter.

No such selection of data is performed by the rotate RAMs 20 of Crozier. The rotate RAMs of Crozier are illustrated in detail in FIG. 3 of Crozier. As seen in FIG. 3, all of the data going into the static RAM comes out of the static RAM. The purpose of the static RAM and delay elements is merely to delay the data in one row relative to the data in another row. However, there is no selection of data inasmuch as all of the data that goes into the RAM, comes out of the RAM. For that reason, there is no selecting operation performed on the received data, where each of the received data is a candidate for selection.

In contrast, each of the PEs in applicant's invention receives the data from all of the other PEs in the row or column in which the PE is situated. Each PE must then select, based on its internal local count, which of the received data is to be selected as its output. No such selection is performed by the barrel shifter or the RAM of Crozier.

If the method of Crozier were to be implemented in the apparatus of Pechanek, there would be no plurality of shifting operations performed such that each processing element in each row or column receives the data originally held by every other processing element in that row or column. Additionally, there would be no selecting operations in which data is selected from among the data received as a result of the plurality of shifting operations. Implementing the method of Crozier on Pechanek, if that is possible, would not result in the claimed invention. For that reason, the 35 U.S.C. § 103 rejection of independent claims 1, 8, 22, and 36 should be withdrawn.

With respect to claims 2, 3, 9, 10, 23, and 24, it is respectfully submitted that the counts in the present invention are used to control which data value is selected from among all of the data that are received within a PE as a result of the shifting operations. That is a different count than the count that is used in Crozier, which is a count to determine how many shift operations will be performed. For that reason, claims 2, 3, 9, 10, 23, and 24 are believed to be patentable.

With respect to claims 4, 5, 6, 11, 12, 13, 25, 26, and 27, the purpose of the count in the present invention is not to stop shifting when the data has arrived in the correct place. Rather, all of the data in each row is input to each PE in each row. The count is used to determine which of the received data is the proper value to be output. Accordingly, claims 4, 5, 6, 11, 12, 13, 25, 26, and 27 are believed to be patentable.

With respect to paragraphs 25 and 32 of the Office action and the rejection of claims 15 and 29, respectively, it is respectfully submitted that there is no "shifting" as that term is used in claim 8, the base claim for claim 15, or as used in claim 22, the base claim for claim 29. Additionally, there is no "selection" as discussed above. Accordingly, claims 15 and 29 are believed to be patentable.

With respect to paragraph 34 of the Office action and the rejection of claims 7, 14, and 28, the rejection of those claims is based on the combination of Crozier and Pechanek as applied to claim 1. Because that combination is believed to not render claim 1 obvious for the reasons discussed above, it is similarly applicant's position that the rejection of claims 7, 14, and 28 must be withdrawn for the same reasons.

The examiner has misperceived applicant's purpose in directing the examiner's attention to the four related applications listed in the first paragraph of the instant application. The purpose for directing the examiner's attention to those applications, which have now issued, is to comply with any duty of candor which current case law may place on an applicant to disclose to the Office-related applications.

Finally, claims 1 and 36 have been amended to more accurately describe the selecting process and not as a result of the rejections made in the Office action.

Applicant has made a diligent effort to place the instant application in condition for allowance. Accordingly, a Notice of Allowance for claims 1-15, 22-29, and 36 is respectfully requested. If the examiner is of the opinion that the instant application is in condition for disposition other than through allowance, the examiner is respectfully requested to contact applicant's attorney.

Respectfully submitted,

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